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United States Department of Agriculture

# Washington Water Supply Outlook Report May 1, 2003

## Washington SNOTEL Sites



# Water Supply Outlook Reports and Federal - State – Private Cooperative Snow Surveys

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## *How forecasts are made*

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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# Washington Water Supply Outlook

May 2003

## General Outlook

Near normal temperatures combined with near to above normal precipitation throughout the month of April helped sustain mountain snowpack. Some areas even recorded slight increases in snowpack. Some of these increased were due to cold snowy storms where others were rain-on-snow events that initially helped boost snow water content. All added water to the snowpack is beneficial, as long as it stays in place until it's needed. Unfortunately we did experience some early runoff, seeing some stations melting out weeks earlier than normal. Salmon Meadows SNOTEL, near Conconully, started the year with above normal snow, then peaked two weeks early in mid March and melted out 20 days early. According to the National Weather Service we can expect a reasonable probability of getting above average precipitation with above normal temperatures for the next month.

## Snowpack

The May 1 statewide SNOTEL readings remain below average at 78%. The Conconully Lake Basin snow surveys reported the lowest readings at 33% of average. Snow surveys in the Omak Creek Basin reported the highest at 116% of average. Westside averages from SNOTEL, and May 1 snow surveys, included the North Puget Sound river basins with 70% of average, the Central Puget river basins with 60%, and the Lewis-Cowlitz basins with 76% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 73% and the Wenatchee area with 84%. Snowpack in the Spokane River Basin was at 58% and the Walla Walla River Basin had 79% of average. Maximum measured snow cover in Washington was at Lyman Lake SNOTEL in the Chelan River Basin, with water content of 60.2 inches. This site would normally have 67.2 inches of water content on May 1. Maximum at Lyman Lake for this season was 61.3 inches on April 25th. The highest average in the state was Grouse Camp SNOTEL site with 143% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane .....	42 .....	58
Newman Lake .....	39 .....	47
Pend Oreille .....	81 .....	89
Okanogan .....	67 .....	72
Methow .....	70 .....	76
Similkameen .....	41 .....	53
Wenatchee .....	62 .....	72
Chelan .....	65 .....	83
Upper Yakima .....	45 .....	63
Lower Yakima .....	76 .....	83
Ahtanum Creek .....	88 .....	91
Walla Walla .....	64 .....	79
Lower Snake .....	86 .....	91
Cowlitz .....	66 .....	81
Lewis .....	43 .....	72
White .....	82 .....	89
Green .....	36 .....	58
Cedar .....	23 .....	57
Snoqualmie .....	37 .....	64
Skykomish .....	42 .....	67
Skagit .....	58 .....	75
Baker .....	72 .....	87
Nooksack .....	47 .....	48
Olympic Peninsula .....	63 .....	75

## Precipitation

During the month of April, the National Weather Service and Natural Resources Conservation Service climate stations reported near to above average precipitation totals throughout most of Washington river basins. The highest percent of average in the state was at Winthrop 1WSW, WA, which reported 332% of average for a total of 2.56 inches. The average for this site is .77 inches for April. The wettest spot in the state was reported at June Lake SNOTEL with an April accumulation of 14.2 inches, nearly 2 inches above the 30-year average for the site. Averages for the water-year increased considerably in most basins. The Lower Snake and Walla river basins reported the highest water-year average at 101%, up slightly from last month. The Upper Yakima River Basin reported the lowest at 83% of average and remained the same as last month with only 76% of average April accumulations.

RIVER BASIN	APRIL PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane .....	94 .....	91
Colville-Pend Oreille .....	93 .....	96
Okanogan-Methow .....	163 .....	100
Wenatchee-Chelan .....	104 .....	90
Upper Yakima .....	76 .....	83
Lower Yakima .....	126 .....	97
Walla Walla .....	123 .....	101
Lower Snake .....	111 .....	101
Cowlitz-Lewis .....	108 .....	93
White-Green-Puyallup .....	103 .....	86
Central Puget Sound .....	80 .....	85
North Puget Sound .....	90 .....	87
Olympic Peninsula .....	130 .....	95

## Reservoir

Seasonal reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation and flood control. Reservoir storage in the Yakima Basin was 616,900-acre feet, 99% of average for the Upper Reaches and 221,500-acre feet, 131% of average for Rimrock and Bumping lakes. Storage at the Okanogan reservoirs was 49% of average for May 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 159,900 acre feet, 64% of average and 67% of capacity; Chelan Lake 295,400-acre feet, 111% of average and 44% of capacity; and the Skagit River reservoirs at 135% of average and 72% of capacity.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane .....	67 .....	64
Colville-Pend Oreille .....	83 .....	201
Okanogan-Methow .....	40 .....	49
Wenatchee-Chelan .....	44 .....	111
Upper Yakima .....	74 .....	99
Lower Yakima .....	96 .....	131
North Puget Sound .....	72 .....	135

*For more information contact your local Natural Resources Conservation Service office.*

## Streamflow

May forecasts vary from 100% of average for Icicle Creek near Leavenworth to 62% of average for Teanaway River near Cle Elum. May-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 90%; Green River, 89%; and Skagit River, 87%. Some Eastern Washington streams include the Yakima River near Parker, 79%; Wenatchee River at Plain, 80%; and Spokane River near Post Falls, 72%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

Statewide April streamflows varied considerably depending on local climate and reservoir operations. The South Fork Walla Walla River near Milton-Freewater had the highest reported flows with 165% of average. The Okanogan River at Tonasket with 64% of average, was the lowest in the state. Other streamflows were the following percentage of average: the Cowlitz, 97%; the Spokane at Spokane, 76%; the Columbia below Rock Island Dam, 102%; and the Cle Elum near Roslyn, 91%.

### BASIN

PERCENT OF AVERAGE  
MOST PROBABLE FORECAST  
(50 PERCENT CHANCE OF EXCEEDENCE)

Spokane .....	72-75
Colville-Pend Oreille .....	72-90
Okanogan-Methow .....	71-85
Wenatchee-Chelan .....	65-100
Upper Yakima .....	62-82
Lower Yakima .....	74-92
Walla Walla .....	86-90
Lower Snake .....	71-99
Cowlitz-Lewis .....	79-86
White-Green-Puyallup .....	86-89
Central Puget Sound .....	85-91
North Puget Sound .....	86-90
Olympic Peninsula .....	86-87

### STREAM

PERCENT OF AVERAGE  
APRIL STREAMFLOWS

Pend Oreille Below Box Canyon .....	111
Kettle at Laurier .....	114
Columbia at Birchbank .....	106
Spokane at Long Lake .....	78
Similkameen at Nighthawk .....	82
Okanogan at Tonasket .....	64
Methow at Pateros .....	76
Chelan at Chelan .....	105
Wenatchee at Pashastin .....	99
Yakima at Cle Elum .....	89
Yakima at Parker .....	96
Naches at Naches .....	113
Grande Ronde at Troy .....	94
Snake below Lower Granite Dam .....	81
SF Walla Walla near Milton Freewater .....	165
Columbia River at The Dalles .....	92
Lewis at Ariel .....	87
Cowlitz below Mayfield Dam .....	98
Skagit at Concrete .....	101

**B A S I N   S U M M A R Y   O F  
S N O W   C O U R S E   D A T A**

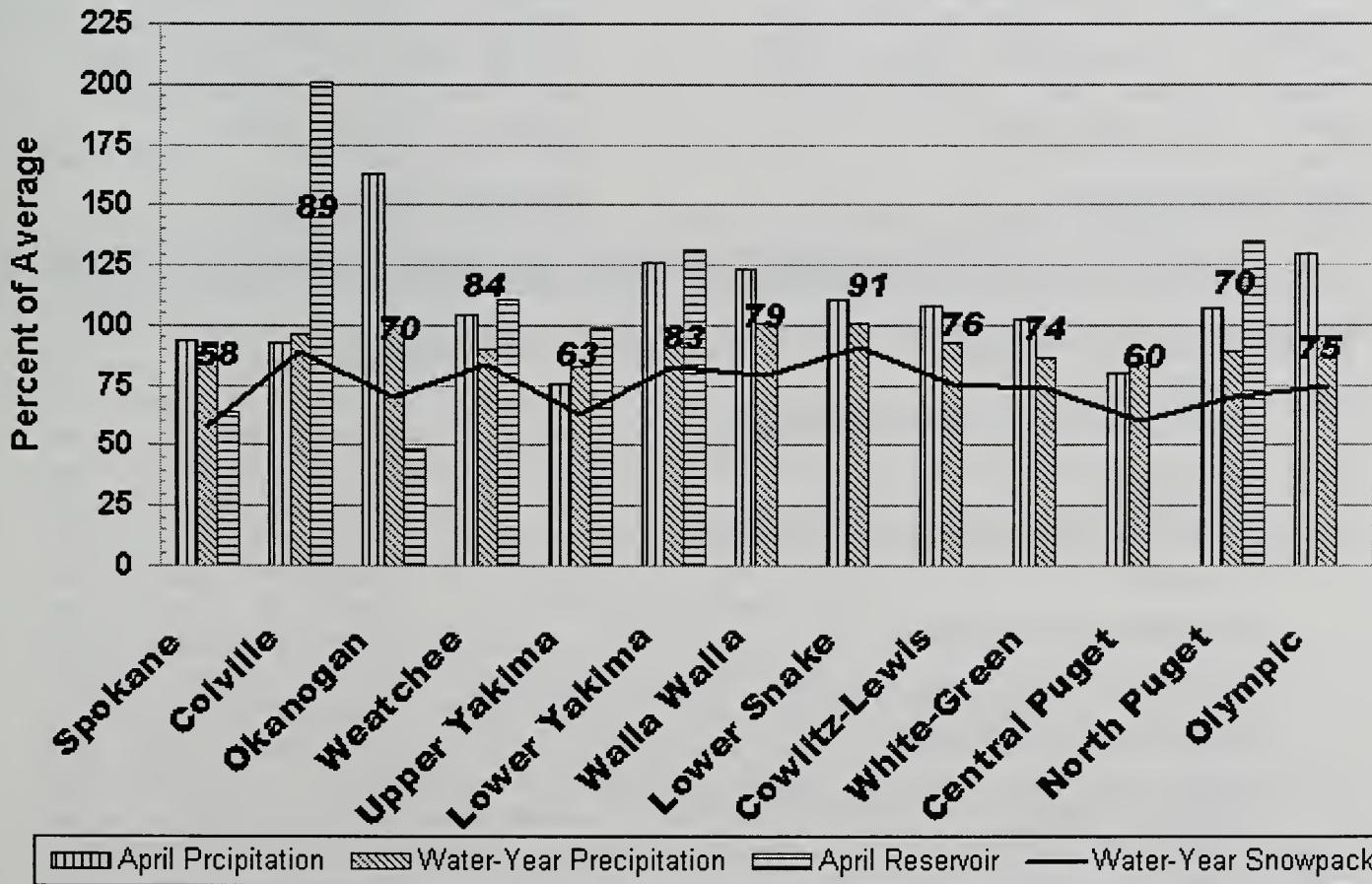
**MAY 2003**

SNOW COURSE	ELATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	SNOW COURSE	ELATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	
ABITANUM R.S.	3100	5/01/03	---	.0E	--	--	LOGAN CREEK	4300	4/29/03	0	.0	2.2	1.7	
ALPINE MEADOWS	3500	5/01/03	---	24.0E	72.3	--	LOLO PASS	5240	5/01/03	61	26.5	29.1	24.5	
ALPINE MEADOWS SNTL	3500	5/01/03	---	26.4	79.3	45.8	LONE PINE	SNOTEL	3800	5/01/03	--	27.2	56.1	34.2
AMBROSE	6480	4/29/03	34	14.1	9.2	11.1	LOOKOUT	SNOTEL	5140	5/01/03	42	17.7	43.8	27.2
ASHLEY DIVIDE	4820	4/29/03	0	.0	.3	1.1	LOST HORSE MTN CAN.	6300	4/27/03	24	7.6	11.8	9.7	
BADGER PASS SNOTEL	6900	5/01/03	61	27.4	48.0	36.2	LOST HORSE	SNOTEL	5000	5/01/03	27	12.0	11.6	10.7
BAREE CREEK	5500	4/24/03	74	32.8	47.6	40.3	LOST LAKE	SNOTEL	6110	5/01/03	--	43.9	76.8	59.7
BAREE MIDWAY	4600	4/24/03	56	22.8	33.2	27.4	LOWER SANDS CREEK #2	3120	4/29/03	0	.0	24.5	15.8	
BAREE TRAIL	3800	4/24/03	0	.0	8.0	1.3	LUBRECHT FOREST NO 3	5450	5/01/03	0	.0	.0	1.7	
BARKER LAKES SNOTEL	8250	5/01/03	58	17.7	13.9	16.2	LUBRECHT FOREST NO 4	4650	5/01/03	0	.0	.0	.1	
BARNES CREEK CAN.	5320	4/29/03	57	20.9	17.9	19.7	LUBRECHT FOREST NO 6	4040	5/01/03	0	.0	.0	.0	
BASIN CREEK SNOTEL	7180	5/01/03	--	9.3	5.0	10.0	LUBRECHT HYDROPLOT	4200	5/01/03	0	.0	.0	.1	
BASSOOG PEAK	5150	4/30/03	0	.0	7.5	3.2	LUBRECHT SNOTEL	4680	5/01/03	0	.0	.0	.5	
BEAVER CREEK TRAIL	2200	4/28/03	0	.0	9.4	4.4	LYMAN LAKE	SNOTEL	5900	5/01/03	--	60.2	88.5	67.2
BEAVER PASS	3680	4/28/03	42	17.2	33.4	27.2	LYNN LAKE		4000	4/29/03	36	16.5	42.0	14.5
BERNE-MILL CREEK (d)	3170	4/29/03	45	18.2	30.0	22.5	MARIAS PASS		5250	5/01/03	15	5.8	20.4	12.5
BIG WHITE MTN CAN.	5510	4/30/03	43	17.8	21.3	19.4	MEADOWS CABIN		1900	4/29/03	0	.0	1.4	1.1
BLACK MOUNTAIN	7750	4/28/03	46	17.3	9.4	16.9	MEADOWS PASS	SNOTEL	3240	5/01/03	--	7.5	33.9	10.8
BLACK PINE SNOTEL	7100	5/01/03	30	11.2	8.6	11.0	MERRITT		2140	4/29/03	0	.0	--	4.0
BLEWETT PASS#2SNOTEL	4270	5/01/03	0	.0	.6	5.0	MICA CREEK	SNOTEL	4750	5/01/03	21	8.8	28.0	15.3
BLUE LAKE	5900	5/01/03	35	14.0	24.4	22.4	MINERAL CREEK		4000	4/29/03	19	7.8	10.0	9.6
BRENDA MINE CAN.	4450	5/01/03	--	4.6	6.3	9.3	MISSEZULA MTN CAN.	5080	4/29/03	5	1.5	8.0	5.5	
BROOKMERE CAN.	3000	4/28/03	0	.0	4.3	4.0	MONASHEE PASS CAN.	4500	4/29/03	31	11.3	9.9	11.4	
BROWN TOP AM	6000	4/28/03	123	55.2	89.6	62.1	MORRISSEY RIDGE CAN.	6100	5/01/03	--	29.5	41.5	27.2	
BRUSH CREEK TIMBER	5000	4/29/03	0	.0	3.8	3.6	MORSE LAKE	SNOTEL	5400	5/01/03	--	55.8	51.5	57.0
BULL MOUNTAIN	6600	4/30/03	0	.0	.0	2.6	MOSES MTN	SNOTEL	4800	5/01/03	--	12.6	11.2	10.9
BUMPING LAKE (NEW)	3400	4/29/03	6	2.3	9.7	10.4	MOSQUITO RDG	SNOTEL	5200	5/01/03	--	25.8	40.2	32.2
BUMPING RIDGE SNOTEL	4600	5/01/03	--	20.5	34.2	27.5	MOULTON RESERVOIR		6850	5/02/03	15	5.5	1.6	3.5
BUNCHGRASS MDWSNOTEL	5000	5/01/03	--	30.1	30.3	28.6	MOUNT CRAG	SNOTEL	4050	5/01/03	46	20.9	31.2	27.8
CARMI CAN.	4100	4/30/03	0	.0	.2	1.1	MT. KOBAU CAN.		5500	4/27/03	37	13.5	12.2	12.8
CAYUSE PASS	5300	5/01/03	--	71.5E	100.0	89.1	MOUNT GARDNER SNOTEL	2860	5/01/03	--	.0	20.3	4.8	
CHESSMAN RESERVOIR	6200	5/01/03	0	.0	1.7	1.7	N.F. ELK CR SNOTEL	6250	5/01/03	27	10.3	7.4	8.0	
CHICKEN CREEK	4060	4/29/03	15	5.2	7.6	5.4	NEW HOZOMEEN LAKE		2800	4/28/03	0	.0	--	3.9
CHIAUKUM G.S.	2500	4/29/03	0	.0	.0	1.7	NEZ PERCE CMP SNOTEL	5650	5/01/03	--	14.7	11.9	10.8	
CITY CABIN	2390	5/01/03	--	.0E	--	--	NEZ PERCE PASS		6570	4/29/03	42	17.0	13.8	14.2
COMBINATION SNOTEL	5600	5/01/03	--	.1	.2	1.2	NOISY BASIN SNOTEL	6040	5/01/03	84	37.0	45.6	43.8	
COPPER BOTTOM SNOTEL	5200	5/01/03	11	4.9	9.8	4.5	NORTH FORK JOCKO		6330	4/28/03	79	34.4	51.7	--
COPPER MOUNTAIN	7700	4/26/03	37	11.0	10.0	10.0	OLALLIE MDWS SNOTEL	3960	5/01/03	--	39.2	74.9	55.1	
CORRAL PASS SNOTEL	6000	5/01/03	--	34.9	46.5	35.3	OLALLIE MEADOWS		3630	5/01/03	--	26.0E	67.0	36.9
COTTONWOOD CREEK	6400	4/28/03	22	7.7	4.5	7.3	OPHIR PARK		7150	4/27/03	38	15.3	12.9	16.0
COUGAR MTN. SNOTEL	3200	5/01/03	4	1.1	26.6	11.0	OXAMA LAKE CAN.	4100	4/30/03	1	.2	2.7	2.6	
COX VALLEY	4500	5/01/03	--	28.0E	44.8	37.1	PARADISE PARK SNOTEL	5500	5/01/03	--	60.1	96.0	74.8	
COYOTE HILL	4200	5/01/03	0	.0	2.2	2.6	PARK CK RIDGE SNOTEL	4600	5/01/03	61	32.4	57.5	39.8	
DALY CREEK SNOTEL	5780	5/01/03	23	8.9	3.1	5.3	PETERSON MDW SNOTEL	7200	5/01/03	--	15.1	8.2	11.0	
DEER PARK	5200	5/01/03	--	12.0E	19.6	15.2	PIGTAIL PEAK SNOTEL	5900	5/01/03	123	53.0	65.7	56.5	
DEVILS PARK	5900	4/30/03	88	38.6	59.8	44.7	PIKE CREEK SNOTEL	5930	5/01/03	41	17.3	33.6	25.9	
DISCOVERY BASIN	7050	4/30/03	39	13.4	6.2	9.4	PIPESTONE PASS		7200	4/26/03	7	1.9	2.2	4.8
DIX HILL	6400	4/27/03	4	1.5	2.9	3.8	POPE RIDGE SNOTEL	3540	5/01/03	16	7.3	6.4	7.0	
DOMMERIE FLATS	2200	4/29/03	0	.0	.0	--	POSTILL LAKE CAN.		4200	4/30/03	13	4.2	6.1	5.3
EAST FORK R.S.	5400	4/30/03	0	.0	.0	.7	POTATO HILL SNOTEL	4500	5/01/03	--	20.8	30.2	18.9	
EAST PASS AM	5200	5/01/03	--	75.5E	110.0	86.9	QUARTZ PEAK SNOTEL	4700	5/01/03	--	7.0	18.0	14.9	
ELBOW LAKE SNOTEL	3200	5/01/03	32	15.5	44.3	32.5	RAGGED RIDGE		3330	4/30/03	0	.0	--	--
EMERY CREEK SNOTEL	4350	5/01/03	--	5.9	6.9	7.4	RAINY PASS SNOTEL	4780	5/01/03	--	34.2	49.1	43.2	
ENDERBY CAN.	5800	4/27/03	108	39.8	51.6	43.5	REX RIVER SNOTEL	1900	5/01/03	25	11.9	47.3	19.0	
ESPHERON CK. UP CAN.	5050	4/27/03	33	10.8	19.5	15.4	ROCKER PEAK SNOTEL	8000	5/01/03	51	17.5	12.6	16.6	
FATTY CREEK	5500	4/28/03	48	18.6	25.4	23.4	SADDLE MTN SNOTEL	7900	5/01/03	80	28.9	25.2	26.5	
FISH CREEK	8000	5/02/03	42	13.2	8.1	11.5	SALMON MDWS SNOTEL	4500	5/01/03	4	1.3	.2	3.9	
FISH LAKE	3370	4/29/03	30	14.9	29.0	23.1	SASSE RIDGE SNOTEL	4200	5/01/03	52	13.2	46.7	32.3	
FISH LAKE SNOTEL	3370	5/01/03	38	15.3	26.8	28.8	SAVAGE PASS SNOTEL	6170	5/01/03	69	27.1	28.1	25.2	
FLATTOP MTN SNOTEL	6300	5/01/03	107	43.1	56.9	46.7	SAWMILL RIDGE		4700	4/29/03	49	20.8	33.2	32.8
FLEECE RIDGE	7500	4/29/03	28	9.1	8.2	8.7	SHEEP CANYON SNOTEL	4050	5/01/03	--	16.0	44.9	32.0	
FREEZEOUT CK. TRAIL	3500	4/29/03	6	1.9	9.7	6.4	SHERWIN SNOTEL		3200	5/01/03	--	0	6.0	3.3
FROHNER MDWS SNOTEL	6480	5/01/03	21	7.2	6.5	6.5	SILVER STAR MTN CAN.	5600	4/28/03	67	26.2	36.1	30.1	
GRASS MOUNTAIN #2	2900	4/29/03	0	.0	8.0	--	SKALKHAO SNOTEL	7260	5/01/03	71	27.2	24.8	25.4	
GRAVE CRK SNOTEL	4300	5/01/03	--	9.4	9.7	7.0	SKITWISH RIDGE		5110	4/29/03	36	15.3	36.9	25.8
GRAYSTOKE LAKE CAN.	5500	4/30/03	39	11.5	--	16.2	SKOOKUM CREEK SNOTEL	3920	5/01/03	--	4.5	50.3	14.6	
GREEN LAKE	6000	5/01/03	--	30.0E	--	37.4	SLIDE ROCK MOUNTAIN		7100	4/29/03	38	15.5	13.1	15.7
GREEN LAKE SNOTEL	6000	5/01/03	60	20.2	25.1	24.6	SOURDOUGH GULCH SNTL	4000	5/01/03	0	.0	.0	--	
GREYBACK RES CAN.	4700	5/01/03	13	4.1	5.7	7.0	SPARDOUGH GULCH SNTL	3860	5/01/03	63	28.7	59.4	42.7	
GRIFFIN CR DIVIDE	5150	4/30/03	0	.0	5.0	4.9	SPENCER MDW SNOTEL	3400	5/01/03	--	11.4	42.3	21.8	
GROUSE CAMP SNOTEL	5380	5/01/03	--	15.9	17.9	11.1	SPRINGER PASS SNOTEL		3100	5/01/03	--	0	.0	--
HAMILTON HILL CAN.	4550	4/29/03	18	6.6	13.8	10.6	SPOTTED BEAR MTN.		7000	5/01/03	10	4.4	10.8	7.6
HAND CREEK SNOTEL	5030	5/01/03	5	1.7	3.9	6.8	SOURDOUGH GULCH SNTL	4000	5/01/03	0	.0	.0	--	
HARTS PASS SNOTEL	6500	5/01/03	86	36.3	53.8	47.7	STAHL PEAK SNOTEL	6030	5/01/03	--	36.1	47.8	37.1	
HELL ROARING DIVIDE	5770	4/28/03	57	22.3	28.8	29.0	STAMPEDE PASS SNOTEL	3860	5/01/03	63	28.7	59.4	42.7	
HERRIG JUNCTION	4850	4/29/03	50	22.0	29.2	22.9	STEAMPLATE PASS		6600	4/25/03	17	5.4	8.2	9.3
HIGH RIDGE SNOTEL	4980	5/01/03	--	11.4	18.8	15.9	STEVENS PASS SNOTEL	4070	5/01/03	62	25.8	43.1	35.2	
HOLBROOK	4530	4/28/03	0	.0	.3	1.2	STEVENS PASS SAND SD	3700	4/29/03	49	20.6	34.2	27.5	
HOODOO BASIN SNOTEL	6050	5/01/03	99	40.0	57.7	45.7	STORM LAKE		7780	4/30/03	46	15.7		

SNOW COURSE		ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	SNOW COURSE		ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
TROUGH #2	SNOTEL	5310	5/01/03	8	4.2	2.4	4.3	UPPER HOLLAND LAKE		6200	5/01/03	72	33.8	41.4	33.5
TROUT CREEK	CAN.	5650	4/28/03	0	.0	5.3	3.7	UPPER WHEELER SNOTEL		4400	5/01/03	10	4.1	7.9	6.3
TRUMAN CREEK		4060	4/29/03	0	.0	.0	.1	VASEUX CREEK CAN.		4250	5/01/03	0	.0	.0	2.3
TUNNEL AVENUE		2450	4/30/03	4	2.2	19.4	12.0	WARM SPRINGS SNOTEL		7800	5/01/03	---	28.0	20.2	23.7
TV MOUNTAIN		6800	4/28/03	37	14.3	17.9	17.4	WATSON LAKES AM		4500	5/01/03	---	56.0E	73.0	64.0
TWELVEMILE SNOTEL		5600	5/01/03	20	6.8	10.3	8.8	WEASEL DIVIDE		5450	4/28/03	67	25.8	38.2	32.7
TWIN CAMP		4100	4/29/03	31	12.5	19.7	20.3	WELLS CREEK SNOTEL		4200	5/01/03	54	21.7	34.7	--
TWIN CREEKS		3580	5/01/03	0	.0	4.5	1.7	WHITE PASS ES SNOTEL		4500	5/01/03	38	15.2	22.7	21.4
TWIN LAKES SNOTEL		6400	5/01/03	89	41.5	43.2	38.5	WHITE ROCKS MTN CAN.		7200	5/01/03	34	13.0	26.2	21.0

**NRCS** Natural Resources  
Conservation Service

**April 1, 2003 -  
Snowpack, Precipitation and Reservoir  
Conditions at a Glance  
(Water Year = October 1, 2002 - Current Date)**





Natural Resources Conservation Service

Washington State  
Snow, Water and Climate Services

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## Helpful Internet Addresses

### NRCS Snow Survey and Climate Services Homepages

Washington:

<http://www.wa.nrcs.usda.gov/snow/snow.htm>

Oregon:

<http://www.or.nrcs.usda.gov/snow/snow.htm>

Idaho:

<http://idsnow.id.nrcs.usda.gov>

National Water and Climate Center (NWCC) :

<http://www.wcc.nrcs.usda.gov>

NWCC Anonymous FTP Server:

<ftp://wcc.nrcs.usda.gov>

### USDA-NRCS Agency Homepages

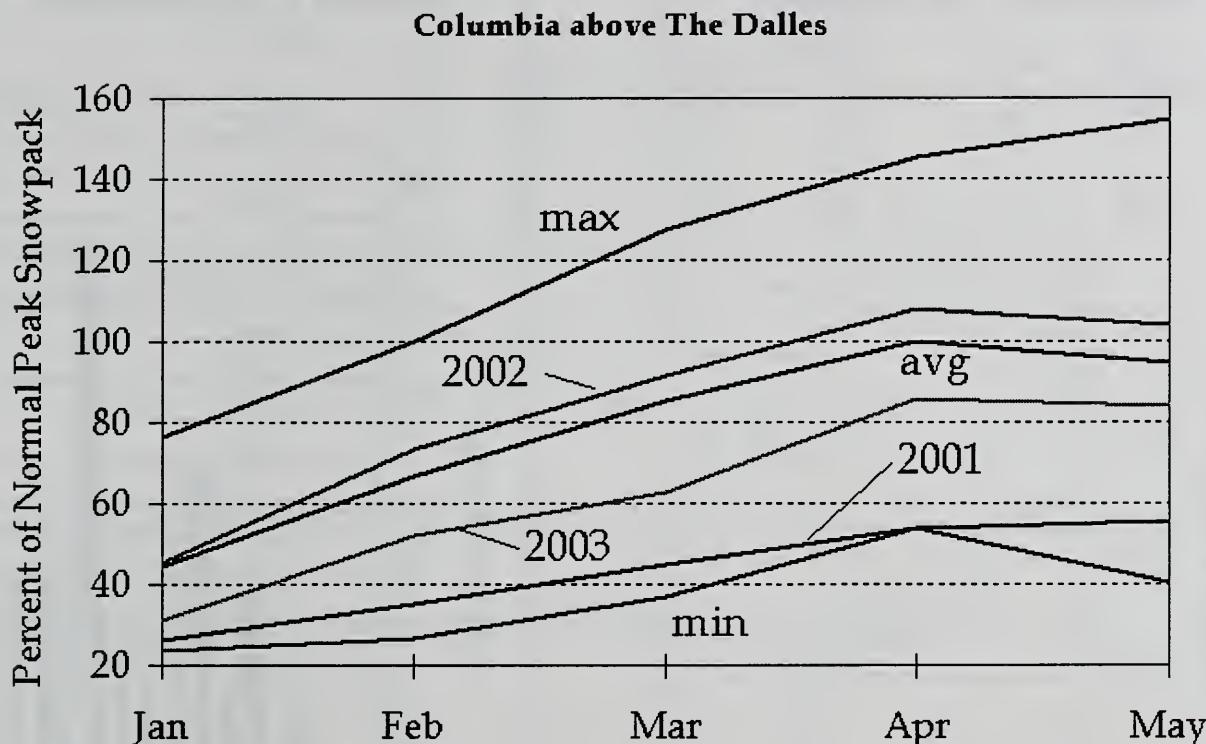
Washington:

<http://www.wa.nrcs.usda.gov/nrcs>

NRCS National:

<http://www.ftw.nrcs.usda.gov>

# Columbia Basin Snowpack Summary



May 1, 2003

Essentially, the Columbia Basin snowpack above The Dalles remained unchanged from last month. The Columbia snowpack now stands at 89 percent of average, compared to 86 percent on April 1. The snowpacks in the Columbia sub-basins also increased slightly. The snowpack above Castlegar is at 87 percent, above Grande Coulee at 88 percent and above Ice Harbor at 98 percent. The percent of peak index at The Dalles decreased from 86 percent to 84 percent of average.

The mountain precipitation can only be described as "streaky" during the month of April. Most of eastern Oregon and southern Idaho received much above average precipitation during April. However, the Snake River headwaters received less than 50 percent of average. Northern Idaho and western Montana received below average mountain precipitation, with most SNOTEL sites reporting between 70 and 90 percent of average. The Cascades precipitation was a mixed bag. It varied from less than 50 percent in the north, gradually increasing to above average in the central portion, to near normal in the southern portion. Based on the snowpack data, precipitation was above average over the Columbia mainstem in Canada.

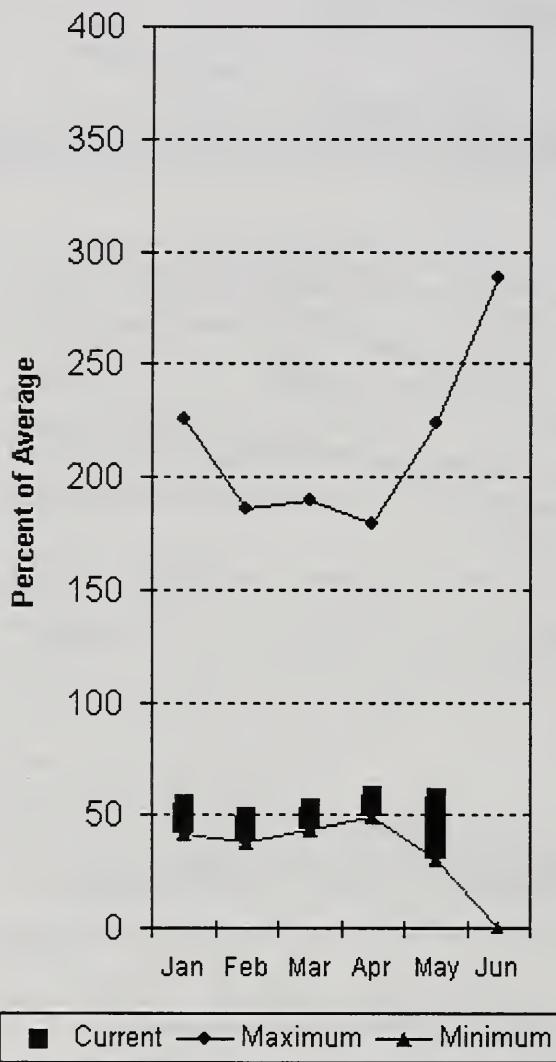
Significant snowpack improvement is noted over the Columbia mainstem in Canada, the Kettle River, the mountains rimming the Snake River Plain, much of eastern Oregon, and the Salmon River. The snowpack worsened over the Kootenai, Pend Oreille, Spokane, Yakima, and the Clearwater basins.

Even though the overall snowpack remained essentially unchanged from April 1, and snowpack conditions improved in several sub-basins, the snowpack remains much below average over a large area. Almost all of the Oregon snowpack remains much below average. It's better than last month, but still much below average.

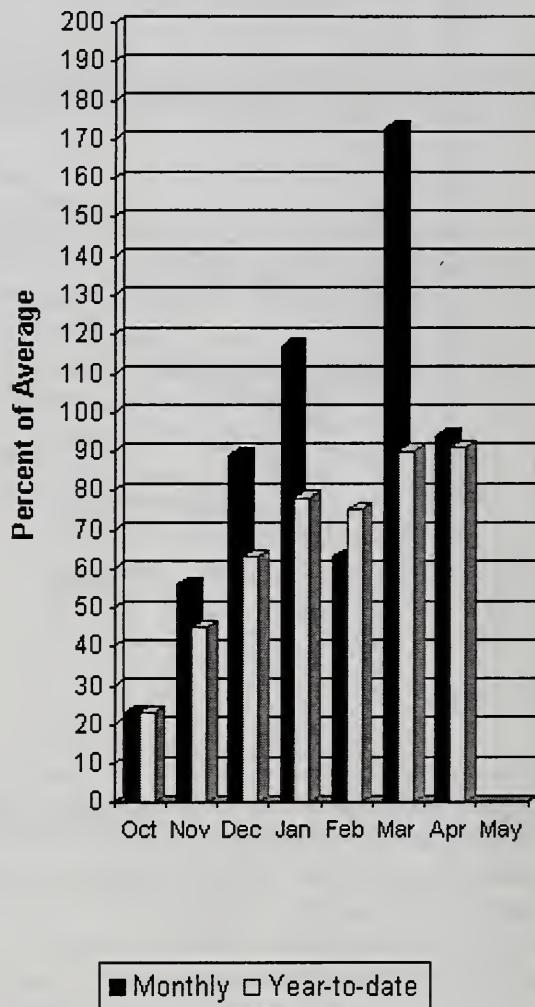
Likewise, the snowpack to the south of the Snake River remains much below average, as it has all year. Water supply conditions are dismal over that area. Below to much below average snowpack conditions also exist over much of the northern Cascades, and portions of the Idaho panhandle, western Montana, and the Kootenai River Basin. Thank goodness for the significant increase in the Columbia headwater snowpack in Canada.

# Spokane River Basin

## Mountain Snowpack\*



## Basin Precipitation\*



\*Based on selected stations

The May 1 forecasts for summer runoff within the Spokane River Basin are 72% of average near Post Falls and 75% at Long Lake. The forecast is based on a basin snowpack that is 58% of average and precipitation that is 91% of average for the water year. Precipitation for April was near normal at 94% of average. Streamflow on the Spokane River at Long Lake, was 78% of average for April. May 1 storage in Coeur d'Alene Lake, was 159,900-acre feet, 64% of average and 67% of capacity. Snowpack at Quartz Peak SNOTEL site was 47% of average with 7 inches of water content. Average temperatures in the Spokane basin were near normal for April and 2 degrees above for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Spokane River Basin

**SPOKANE RIVER BASIN**  
Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)	
		Chance Of Exceeding *							
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)		
POKANE near Post Falls (2)	MAY-SEP	870	1115	1280	72	1450	1690	1771	
	MAY-JUL	820	1050	1210	72	1365	1605	1673	
POKANE at Long Lake (2)	MAY-JUL	980	1250	1430	75	1610	1880	1905	
	MAY-SEP	1130	1410	1600	75	1790	2070	2126	

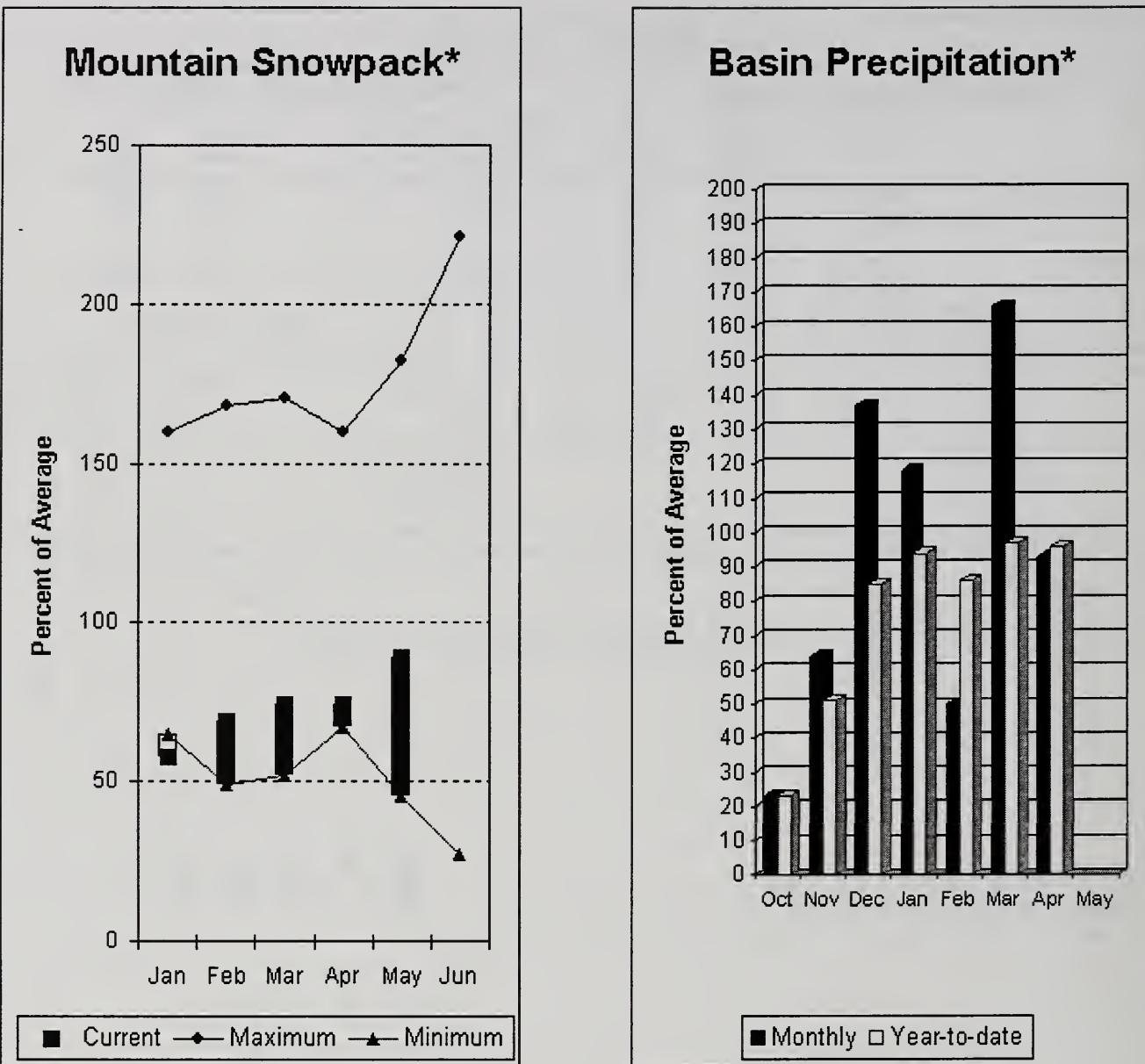
SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of April				SPOKANE RIVER BASIN Watershed Snowpack Analysis - May 1, 2003				
eservoir	Usable Capacity	*** Usable Storage ***		Watershed	Number of Data Sites	This Year as % of		
	This Year	Last Year	Avg		Last Yr	Average		
OEUR D'ALENE	238.5	159.9	273.5	249.7	SPOKANE RIVER	10	42	58
				NEWMAN LAKE	1	39	47	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- 1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- 2) - The value is natural volume - actual volume may be affected by upstream water management.

## Colville - Pend Oreille River Basins



\*Based on selected stations

The May – September average forecast for the Kettle River streamflow is 80%, Colville at Kettle Falls is 90%, and Priest River near the town of Priest River is 87%. April streamflow was 111% of average on the Pend Oreille River, 106% on the Columbia at Birchbank and 114% on the Kettle River. May 1 snow cover was 89% of average in the Pend Oreille Basin River Basin and 91% at 5 sites in the Kettle River Basin. Bunchgrass Meadows SNOTEL site had 301 inches of snow water on the snow pillow. Normally Bunchgrass would have 28.6 inches on May 1. Precipitation during April was 93% of average, bringing the year-to-date precipitation to 96% of average. Reservoir storage in Roosevelt Lake was reported to be 201% of average and 83% of capacity on May 1. Average temperatures were near normal for April and 2 degrees above for the water year.

# Colville - Pend Oreille River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)	
		<===== Drier =====		Chance Of Exceeding *		Wetter =====>			
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)		
PEND OREILLE Lake Inflow (2)	MAY-JUL	7480	8380	8990	85	9600	10500	10600	
	MAY-SEP	8320	9320	10000	85	10680	11680	11800	
PRIEST near Priest River (1,2)	MAY-JUL	430	505	540	88	575	650	616	
	MAY-SEP	450	545	585	87	625	720	670	
PEND OREILLE bl Box Canyon (2)	MAY-JUL	7170	8290	9050	85	9810	10930	10700	
	MAY-SEP	8170	9320	10100	85	10880	12030	11900	
CHAMOKANE CREEK near Long Lake	MAY-AUG	3.7	5.8	7.3	72	8.8	10.9	10.2	
	JUL-AUG	2.60	2.80	3.00	86	3.20	3.40	3.51	
COLVILLE at Kettle Falls	MAY-SEP	57	73	83	90	93	109	92	
	MAY-JUL	50	63	72	91	81	94	79	
KETTLE near Laurier	MAY-SEP	1050	1210	1320	80	1430	1590	1641	
	MAY-JUL	1000	1140	1230	80	1320	1460	1542	
COLUMBIA at Birchbank (1,2)	MAY-JUL	24132	26379	27400	85	28420	30670	32090	
	MAY-SEP	30736	33599	34900	86	36200	39060	40760	
COLUMBIA at Grand Coulee Dm (1,2)	MAY-SEP	42323	46502	48400	84	50300	54480	57921	
	MAY-JUL	34513	37942	39500	83	41060	44490	47614	

COLVILLE - PEND OREILLE RIVER BASINS  
Reservoir Storage (1000 AF) - End of April

COLVILLE - PEND OREILLE RIVER BASINS  
Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr	Average
		This Year	Last Year	Avg				
ROOSEVELT	5232.0	4281.1	1684.6	1873.7	COLVILLE RIVER	0	0	0
BANKS	715.0	675.1	658.2	591.1	PEND OREILLE RIVER	10	70	86
					KETTLE RIVER	6	97	86

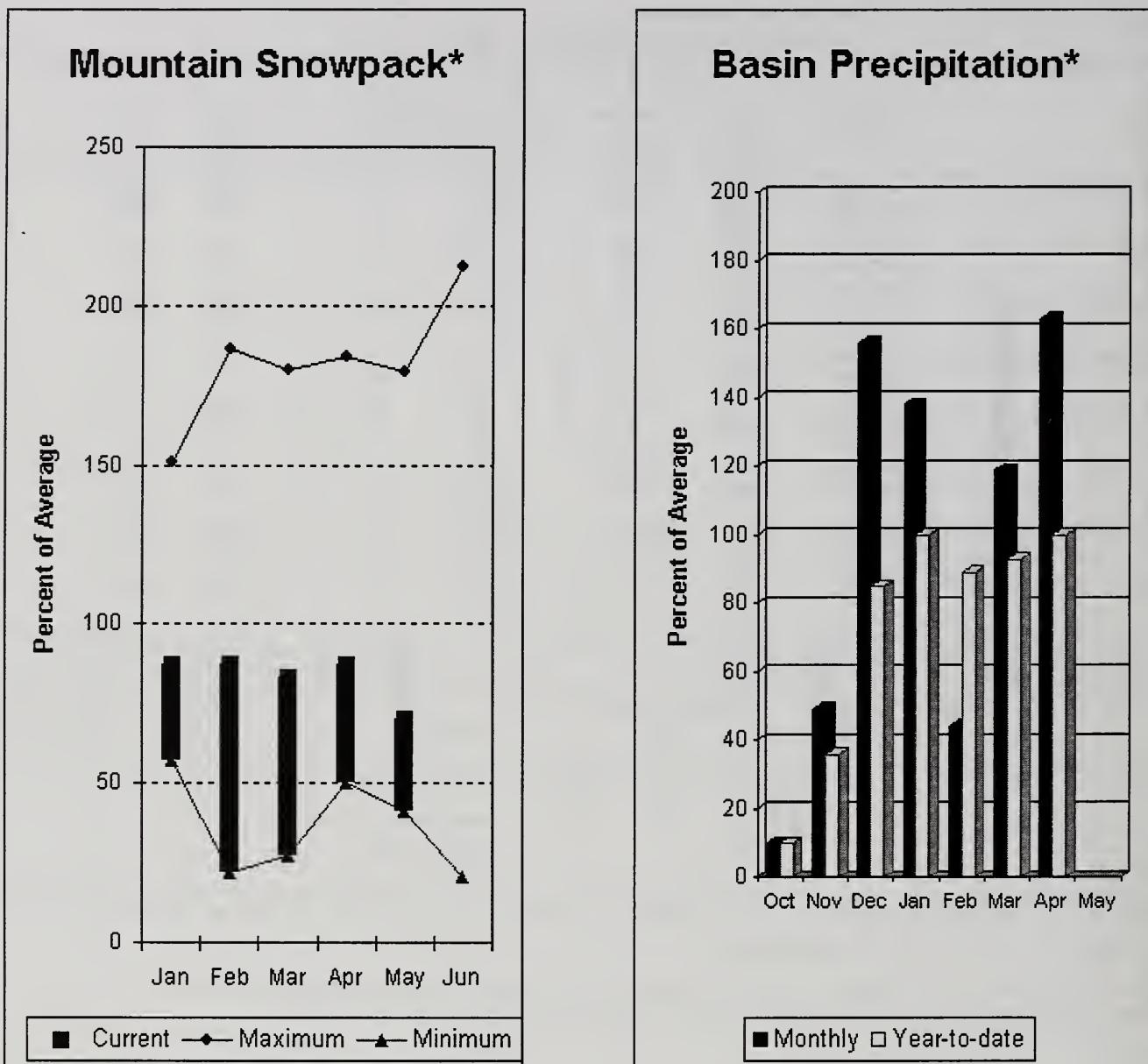
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

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## Okanogan - Methow River Basins



\*Based on selected stations

Summer runoff average forecast for the Okanogan River is 74%, Similkameen River is 72%, Methow River is 85%, Salmon Creek is 71% and Beaver Creek is 85%. May 1 snow cover on the Okanogan was 72% of average and Methow was 76%. April precipitation in the Okanogan-Methow was 163% of average, with precipitation for the water year at 100% of average. April streamflow for the Methow River was 76% of average, 64% for the Okanogan River and 82% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 1.3 inches. Average for this site is 3.9 inches on May 1. Combined storage in the Conconully Reservoirs was 9,400-acre feet, which is 40% of capacity and 49% of the May 1 average. Temperatures were 2 degrees below normal for the past month and 2 degrees above normal for the water year.

# Okanogan - Methow River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		<===== Drier =====		Chance Of Exceeding *			Wetter =====>	
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
SIMILKAMEEN near Nighthawk (1)	MAY-JUL	600	795	880	72	965	1155	1220
	MAY-SEP	670	865	955	72	1045	1245	1325
OKANOGAN near Tonasket (1)	MAY-JUL	560	895	1050	75	1205	1535	1403
	MAY-SEP	650	1015	1180	74	1350	1710	1589
SALMON CREEK near Conconully	MAY-JUL	2.4	8.4	12.4	71	16.4	22	17.4
	MAY-SEP	2.5	8.7	13.0	71	17.3	24	18.3
BEAVER CREEK below SF near Twisp	MAY-SEP	5.5	7.9	9.5	85	11.1	13.5	11.2
	MAY-JUL	4.6	6.9	8.5	84	10.1	12.4	10.1
METHOW RIVER near Pateros	MAY-SEP	645	705	750	85	795	855	882
	MAY-JUL	590	645	685	85	725	780	808

## OKANOGAN - METHOW RIVER BASINS Reservoir Storage (1000 AF) - End of April

## OKANOGAN - METHOW RIVER BASINS Watershed Snowpack Analysis - May 1, 2003

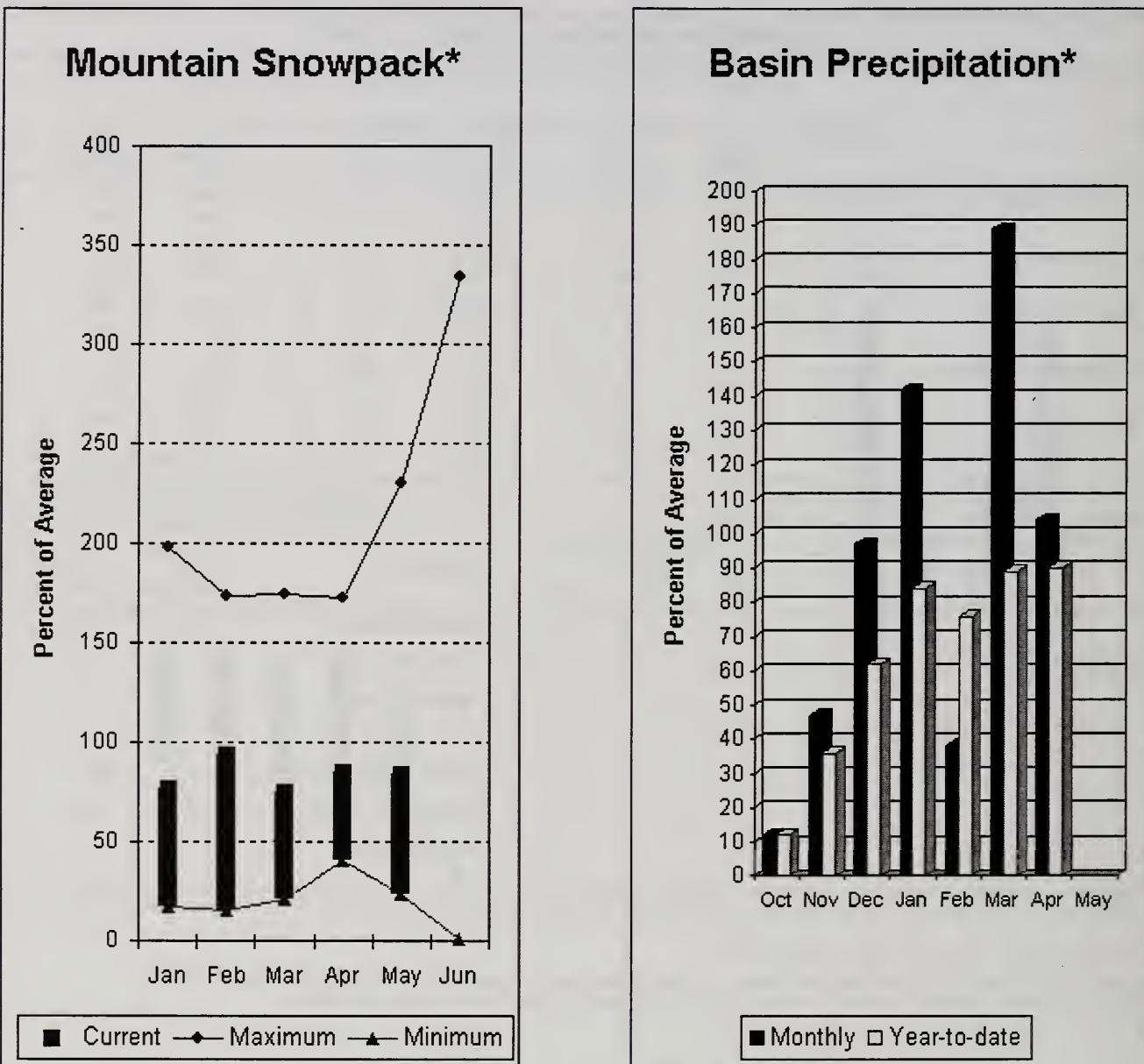
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
SALMON LAKE	10.5	3.6	3.7	8.9	OKANOGAN RIVER	20	67	72
CONCONULLY RESERVOIR	13.0	5.8	4.1	10.1	OMAK CREEK	1	113	116
					SANPOIL RIVER	0	0	0
					SIMILKAMEEN RIVER	4	41	53
					TOATS COULEE CREEK	0	0	0
					CONCONULLY LAKE	1	650	33
					METHOW RIVER	3	70	76

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

## Wenatchee - Chelan River Basins



\*Based on selected stations

Precipitation during April was 104% of average in the basin and 90% for the year-to-date. Runoff for Entiat River is forecast to be 83% of average for the summer. The May-September average forecast for Chelan River is 82%, Wenatchee River at Plain is 80%, Stehekin River is 87%, Icicle Creek near Leavenworth is 100% and Stemilt Creek is 65%. April average streamflows on the Chelan River were 105% and on the Wenatchee River 99%. May 1 snowpack in the Wenatchee River Basin was 72% of average; the Chelan, 83%; the Entiat, 104%; Stemilt Creek, 65% and Colockum Creek, 98%. Reservoir storage in Lake Chelan was 295,400-acre feet, 111% of May 1 average and 44% of capacity. Lyman Lake SNOTEL had the most snow water with 60.2 inches of water. This site would normally have 67.2 inches on May 1. Temperatures were 1-2 degrees below normal for April and 2-3 degrees above normal for the water year.

# Wenatchee - Chelan River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>				30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	Chance Of Exceeding * (1000AF) (%) AVG.)	30% (1000AF)	
CHELAN RIVER near Chelan	MAY-SEP	750	815	860 82	905 975	1050
	MAY-JUL	645	710	750 82	790 855	911
STEHEKIN near STEHEKIN	MAY-SEP	565	615	645 87	675 725	746
	MAY-JUL	455	500	530 86	560 605	618
ENTIAT RIVER near Ardenvoir	MAY-SEP	159	172	181 83	190 205	217
	MAY-JUL	142	155	164 84	173 186	195
WENATCHEE at Plain	MAY-SEP	700	775	825 80	875 950	1035
	MAY-JUL	640	695	735 80	775 830	915
WENATCHEE R. at Peshastin	MAY-SEP	592	883	1080 77	1277 1570	1407
	MAY-JUL	530	789	965 77	1141 1400	1254
STEMILT nr Wenatchee (miners in)	MAY-SEP	45	72	90 65	108 135	138
ICICLE CREEK near Leavenworth	MAY-SEP	290	300	305 100	310 320	305
	MAY-JUL	255	270	280 100	290 305	279
COLUMBIA R. bl Rock Island Dam (2)	MAY-SEP	47179	50764	53200 85	55640 59220	62987
	MAY-JUL	38021	41521	43900 84	46280 49780	52239

WENATCHEE - CHELAN RIVER BASINS Reservoir Storage (1000 AF) - End of April				WENATCHEE - CHELAN RIVER BASINS Watershed Snowpack Analysis - May 1, 2003			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of
		This Year	Last Year	Avg			Last Yr
CHELAN LAKE	676.1	295.4	196.2	265.6	CHELAN LAKE BASIN	4	65
					ENTIAT RIVER	1	114
					WENATCHEE RIVER	11	62
					SQUILCHUCK CREEK	0	0
					STEMILT CREEK	1	52
					COLOCKUM CREEK	1	175
							98

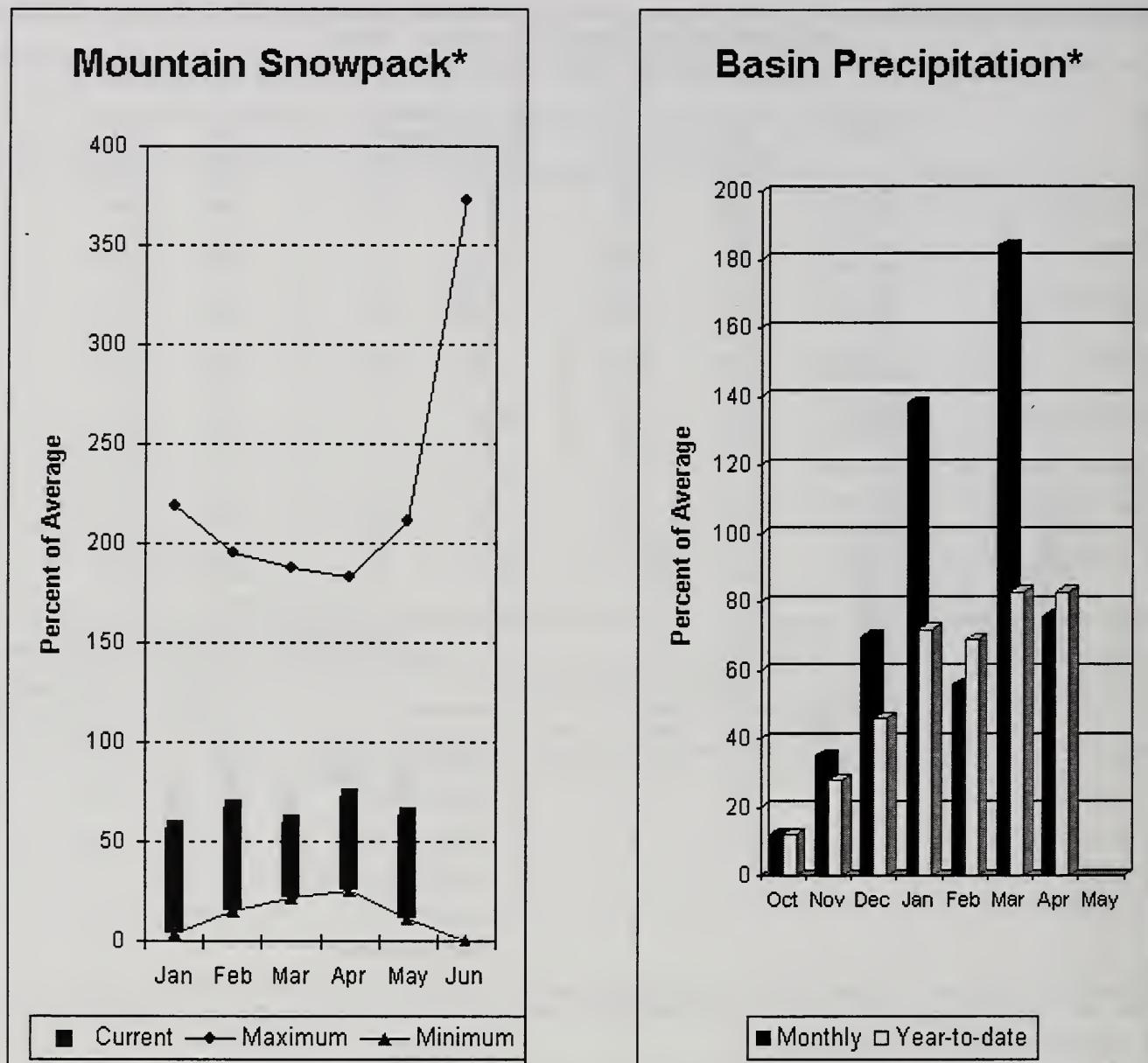
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural volume - actual volume may be affected by upstream water management.

# Upper Yakima River Basin



\*Based on selected stations

May 1 reservoir storage for the Upper Yakima reservoirs was 616,900-acre feet, 99% of average. Forecasts for the Yakima River at Cle Elum are 79% of average and the Teanaway River near Cle Elum is at 62%. Lake inflows are all forecasted to fall into the same range this summer. April streamflows within the basin were Yakima near Cle Elum at 89% and Cle Elum River near Roslyn at 91%. May 1 snowpack was 63% based upon 9 snow courses and SNOTEL readings within the Upper Yakima Basin. Precipitation was 76% of average for April and 83% year-to-date for water. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

# Upper Yakima River Basin

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *		50% (Most Probable) (1000AF) (% AVG.)		30% (1000AF) 10% (1000AF)		
		90% (1000AF)	70% (1000AF)					
KEECHELUS LAKE INFLOW	MAY-JUL	53	63	70	76	77	87	92
	MAY-SEP	57	70	78	76	86	99	103
KACHESS LAKE INFLOW	MAY-JUL	56	63	68	81	73	80	84
	MAY-SEP	61	69	75	82	81	89	92
CLE ELUM LAKE INFLOW	MAY-JUL	240	255	270	81	285	300	332
	MAY-SEP	260	285	300	80	315	340	373
YAKIMA at Cle Elum	MAY-JUL	435	475	505	80	535	575	634
	MAY-SEP	480	530	565	79	600	650	714
TEANAWAY near Cle Elum	MAY-JUL	42	51	57	63	63	72	91
	MAY-SEP	44	53	59	62	65	74	95

UPPER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of April				UPPER YAKIMA RIVER BASIN Watershed Snowpack Analysis - May 1, 2003				
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
KEECHELUS	157.8	92.2	122.4	125.6	UPPER YAKIMA RIVER	9	45	63
KACHESS	239.0	200.5	148.6	188.3				
CLE ELUM	436.9	324.2	276.1	307.0				

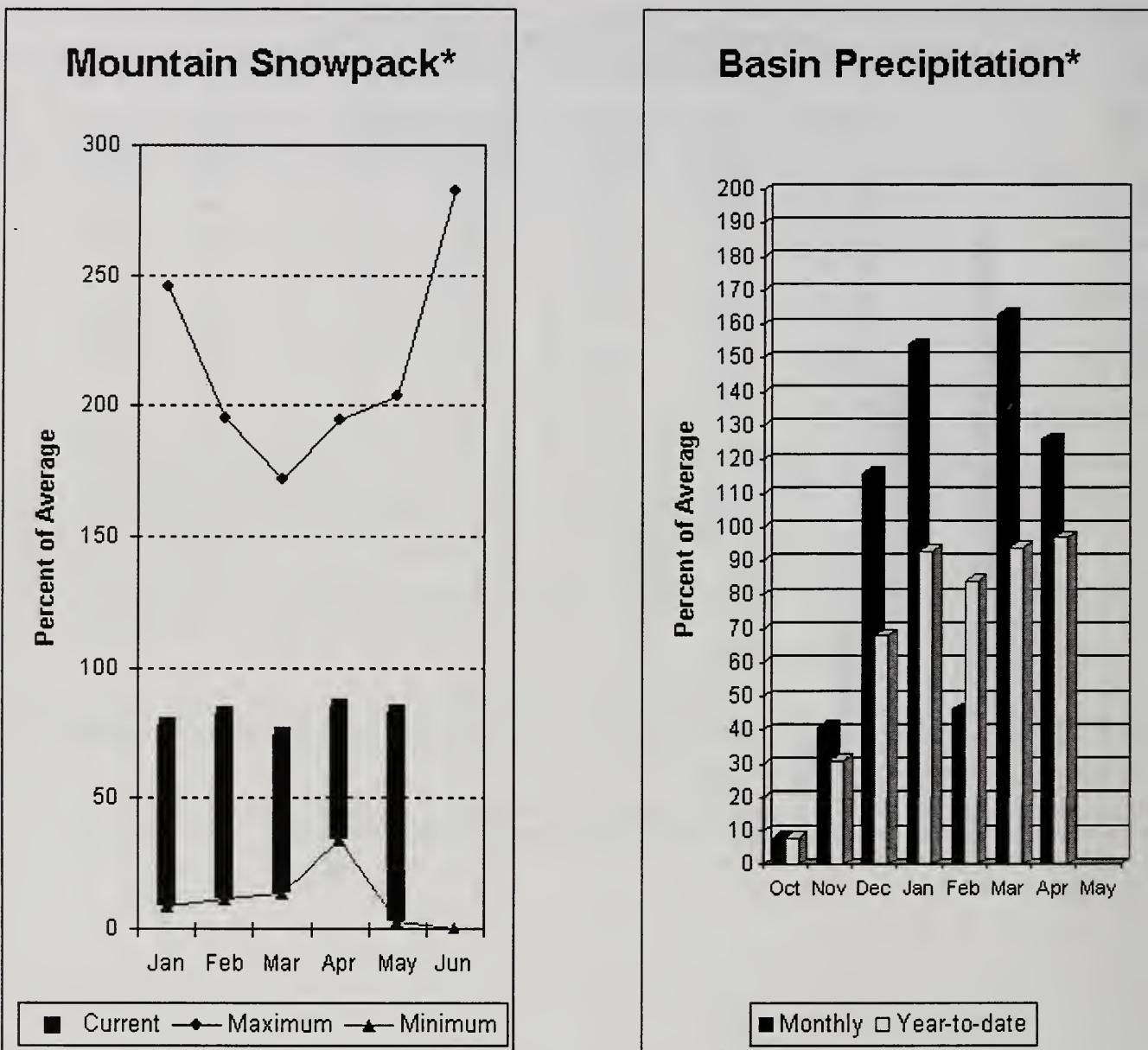
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural volume - actual volume may be affected by upstream water management.

## Lower Yakima River Basin



\*Based on selected stations

April average streamflows within the basin were: Yakima River near Parker, 96%; Naches River near Naches, 113%; and Yakima River at Kiona, 87%. May 1 reservoir storage for Bumping and Rimrock reservoirs was 221,500-acre feet, 131% of average. Forecast averages for Yakima River near Parker are 79%; American River near Nile, 89%; Ahtanum Creek, 92%; and Klickitat River near Glenwood, 85%. May 1 snowpack was 83% based upon 7 snow courses and SNOTEL readings within the Lower Yakima Basin and 91% of average in the Ahtanum Creek Basin. Precipitation was 126% of average for April and 97% year-to-date for water. Temperatures were near normal for the month and 2 degrees above average for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they May differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

# Lower Yakima River Basin

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>					30-Yr Avg. (1000AF)	
		Chance Of Exceeding *		30% (1000AF) 10% (1000AF)				
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)			
BUMPING LAKE INFLOW	MAY-SEP	74	85	92	81	99	113	
	MAY-JUL	70	78	84	82	90	103	
AMERICAN RIVER near Nile	MAY-SEP	74	83	89	89	95	104	
	MAY-JUL	66	74	80	89	86	94	
RIMROCK LAKE INFLOW	MAY-SEP	143	158	169	82	180	195	
	MAY-JUL	121	132	140	83	148	159	
NACHES near Naches	MAY-SEP	410	465	500	74	535	590	
	MAY-JUL	370	415	445	74	475	520	
AHTANUM CREEK nr Tampico (2)	MAY-SEP	26	32	35	92	38	38	
	MAY-JUL	24	29	32	94	35	40	
YAKIMA near Parker	MAY-SEP	1000	1100	1170	79	1240	1340	
	MAY-JUL	870	960	1020	79	1080	1170	
KLICKITAT near Glenwood	MAY-JUN	72	80	86	84	92	100	
	MAY-SEP	96	107	115	85	123	134	

## LOWER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of April

## LOWER YAKIMA RIVER BASIN Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average
		This Year	Last Year	Avg			
BUMPING LAKE	33.7	30.2	26.2	19.6			
RIMROCK	198.0	191.3	157.4	149.4			

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

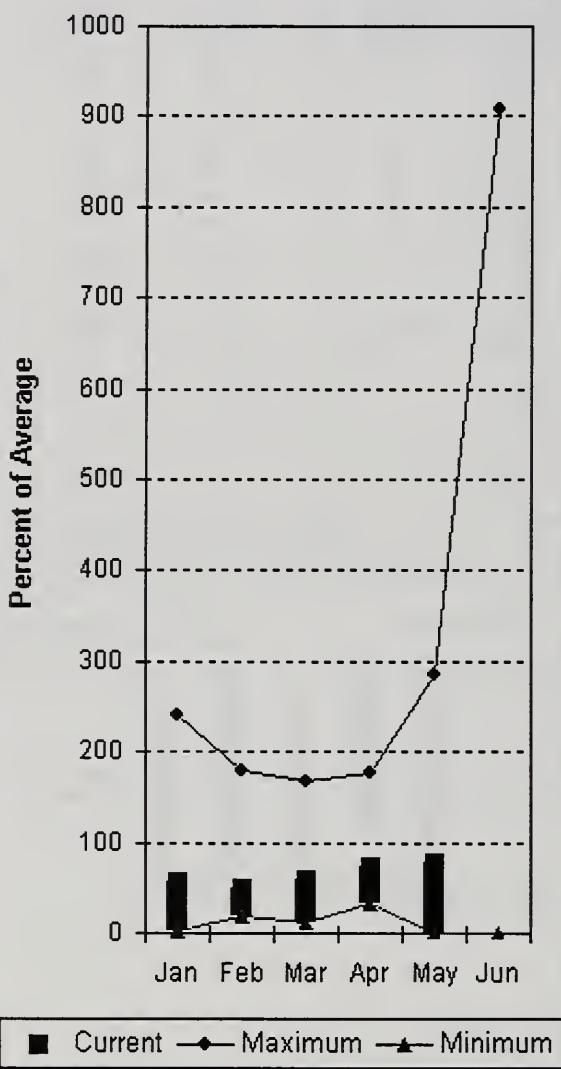
The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

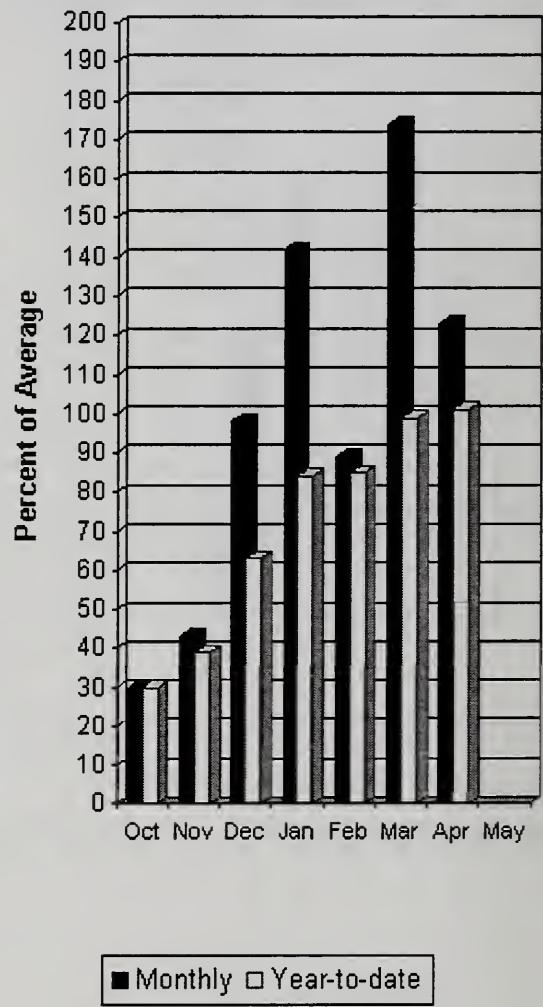
(2) - The value is natural volume - actual volume may be affected by upstream water management.

## Walla Walla River Basin

### Mountain Snowpack\*



### Basin Precipitation\*



\*Based on selected stations

April precipitation was 123% of average, maintaining the year-to-date precipitation at 101% of average. Snowpack in the basin was 79% of average. Streamflow forecasts are 86% of average for Mill Creek and 90% for the SF Walla Walla near Milton-Freewater. April streamflow was 165% of average for the Walla Walla River. Average temperatures were near normal for April and 1 degree above average for the water year.

# Walla Walla River Basin

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>				30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	% AVG.)	
MILL CREEK at Walla Walla	MAY-SEP	4.50	6.40	7.70	86	9.00
	MAY-JUL	4.30	6.20	7.50	84	10.90
SF WALLA WALLA near Milton-Freewater	MAY-JUL	26	30	33	89	36
	MAY-SEP	37	42	45	90	40
WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of April				WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - May 1, 2003		

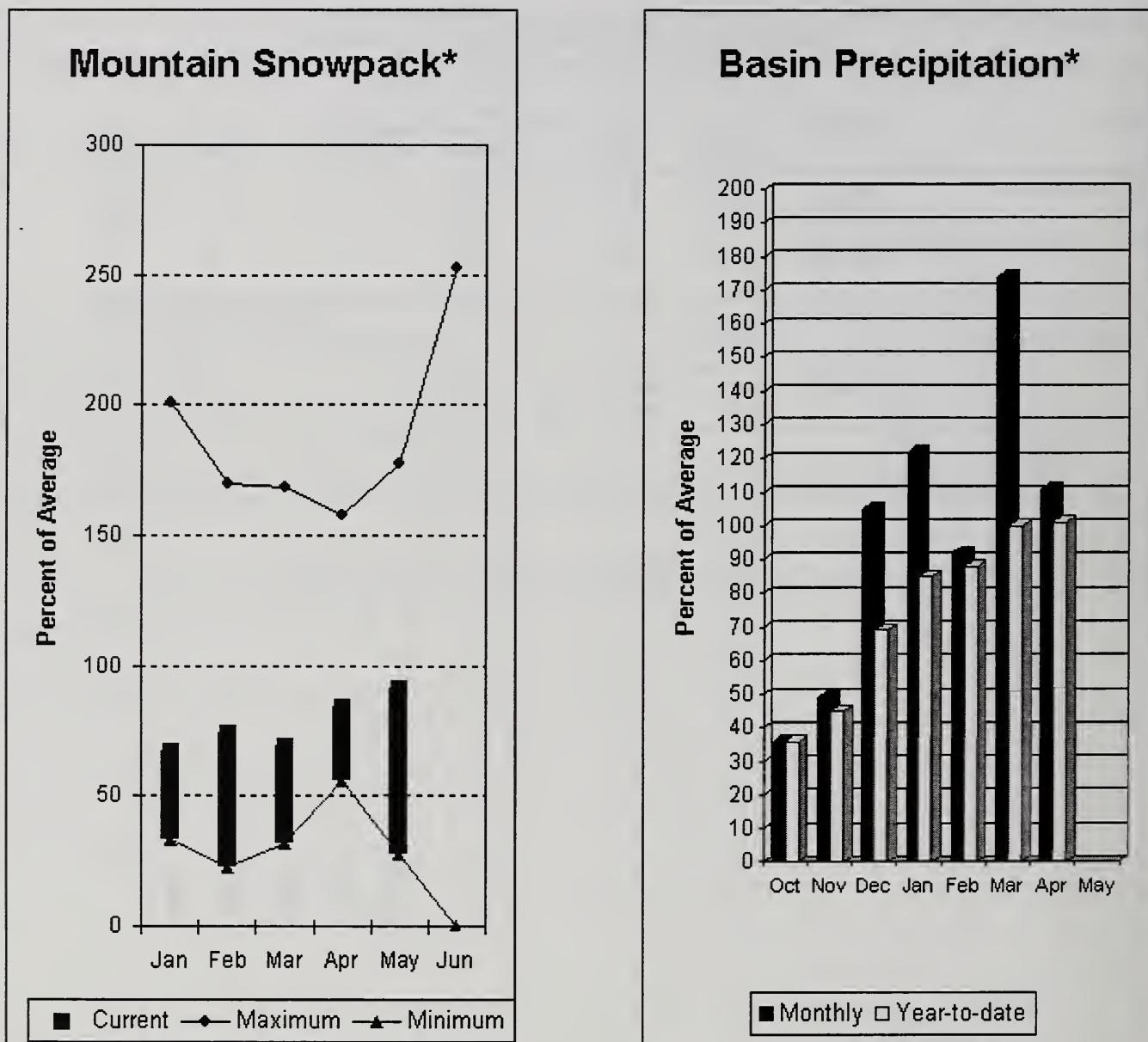
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average
		This Year	Last Year	Avg			
					WALLA WALLA RIVER	2	64 79

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

## Lower Snake River Basin



\*Based on selected stations

The May - September forecast is for 99% for Clearwater River at Spalding. The Snake and Grande Ronde rivers can expect summer flows to be about 86% and 71% of normal respectively. April precipitation was 111% of average, bringing the year-to-date precipitation to 101% of average. May 1, snowpack readings averaged 91% of normal. April streamflow was 81% of average for Snake River below Lower Granite Dam and 94% for Grande Ronde River near Troy. Average temperatures were near normal for April and 1 degree above normal for the water year.

# Lower Snake River Basin

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)	
		Chance Of Exceeding *							
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)		
GRANDE RONDE at Troy (1)	MAY-JUL	376	544	620	71	696	865	872	
	MAY-SEP	418	605	690	71	775	960	970	
CLEARWATER at Spalding (1,2)	MAY-JUL	4600	5340	5680	98	6020	6760	5773	
	MAY-SEP	4970	5770	6130	99	6490	7290	6188	
SNAKE blw Lower Granite Dam (1,2)	MAY-JUL	11310	13572	14600	86	15630	17890	16940	
	MAY-SEP	12995	15612	16800	86	17990	20600	19650	

## LOWER SNAKE RIVER BASIN Reservoir Storage (1000 AF) - End of April

## LOWER SNAKE RIVER BASIN Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average
		This Year	Last Year	Avg			
					LOWER SNAKE, GRANDE RONDE	13	86 91

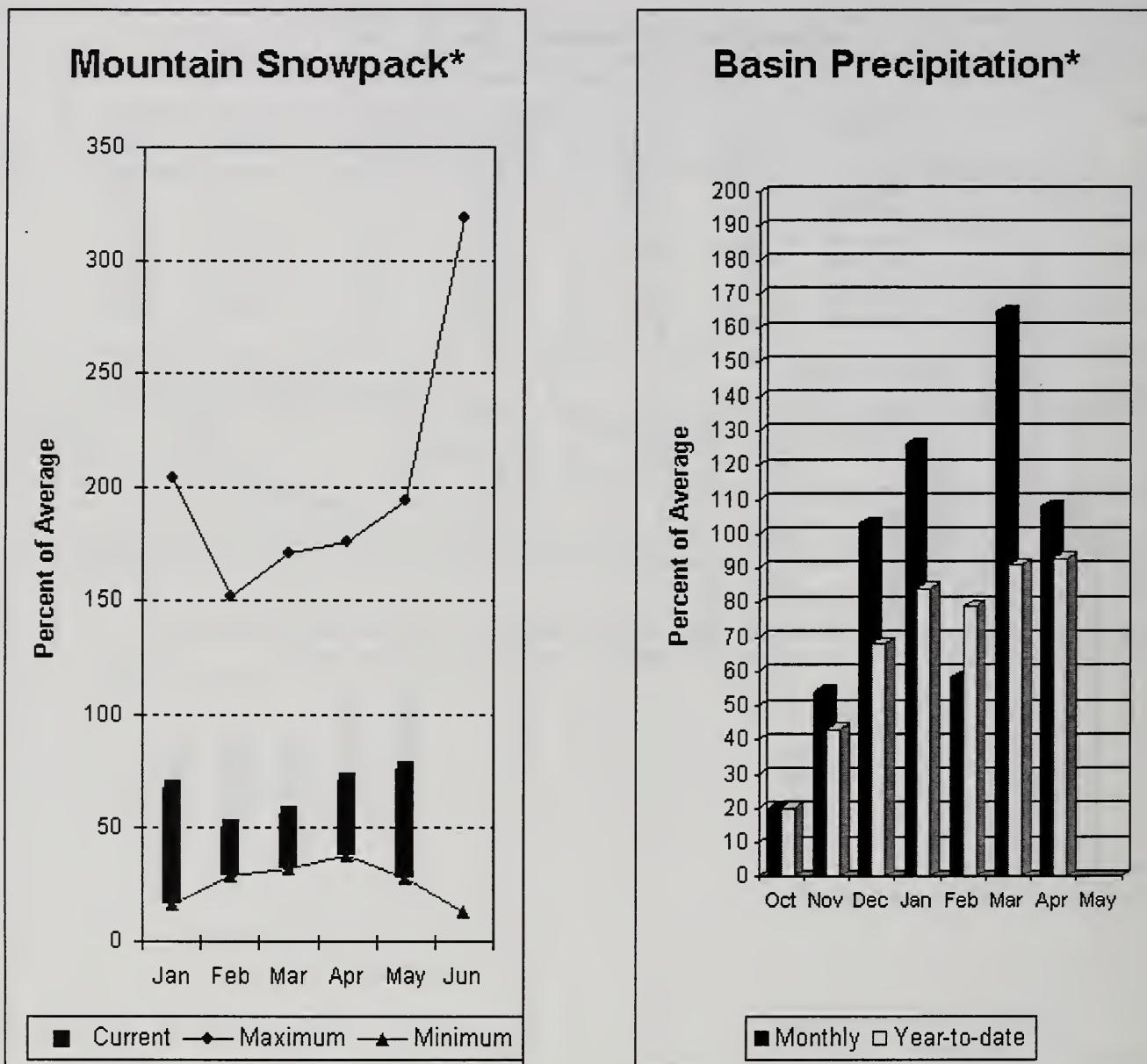
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The average is computed for the 1971-2000 base period.

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## Cowlitz - Lewis River Basins



\*Based on selected stations

Forecasts for May – September streamflows within the basin are Lewis River at Ariel, 86% and Cowlitz River at Castle Rock, 80% of average. April average streamflow for Cowlitz River was 98% and 87% for Lewis River. The Columbia River at The Dalles was 92% of average. April precipitation was 108% of average and the water-year average was 93%. May 1 snow cover for Cowlitz River was 81%, and Lewis River was 72% of average. Average temperatures were near normal during April and have averaged 2 degrees above throughout the water year.

# Cowlitz - Lewis River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)	
		Chance Of Exceeding *		30% (1000AF) 10% (1000AF)					
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)				
LEWIS at Ariel (2)	MAY-JUL	436	510	560	84	610	684	667	
	MAY-SEP	568	644	695	86	746	822	812	
COWLITZ R. bl Mayfield Dam (2)	MAY-SEP	380	844	1160	79	1476	1940	1478	
	MAY-JUL	329	719	985	79	1251	1641	1247	
COWLITZ R. at Castle Rock (2)	MAY-SEP	523	1117	1520	80	1923	2517	1893	
	MAY-JUL	390	884	1220	77	1556	2050	1581	
KLICKITAT near Glenwood	MAY-JUN	72	80	86	84	92	100	102	
	MAY-SEP	96	107	115	85	123	134	135	
COLUMBIA R. at The Dalles (2)	MAY-SEP	57944	64765	69400	81	74030	80860	85635	
	MAY-JUL	48044	53734	57600	81	61470	67160	71413	

### COWLITZ - LEWIS RIVER BASINS Reservoir Storage (1000 AF) - End of April

### COWLITZ - LEWIS RIVER BASINS Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average
		This Year	Last Year	Avg			
					LEWIS RIVER	4	43
					COWLITZ RIVER	6	81

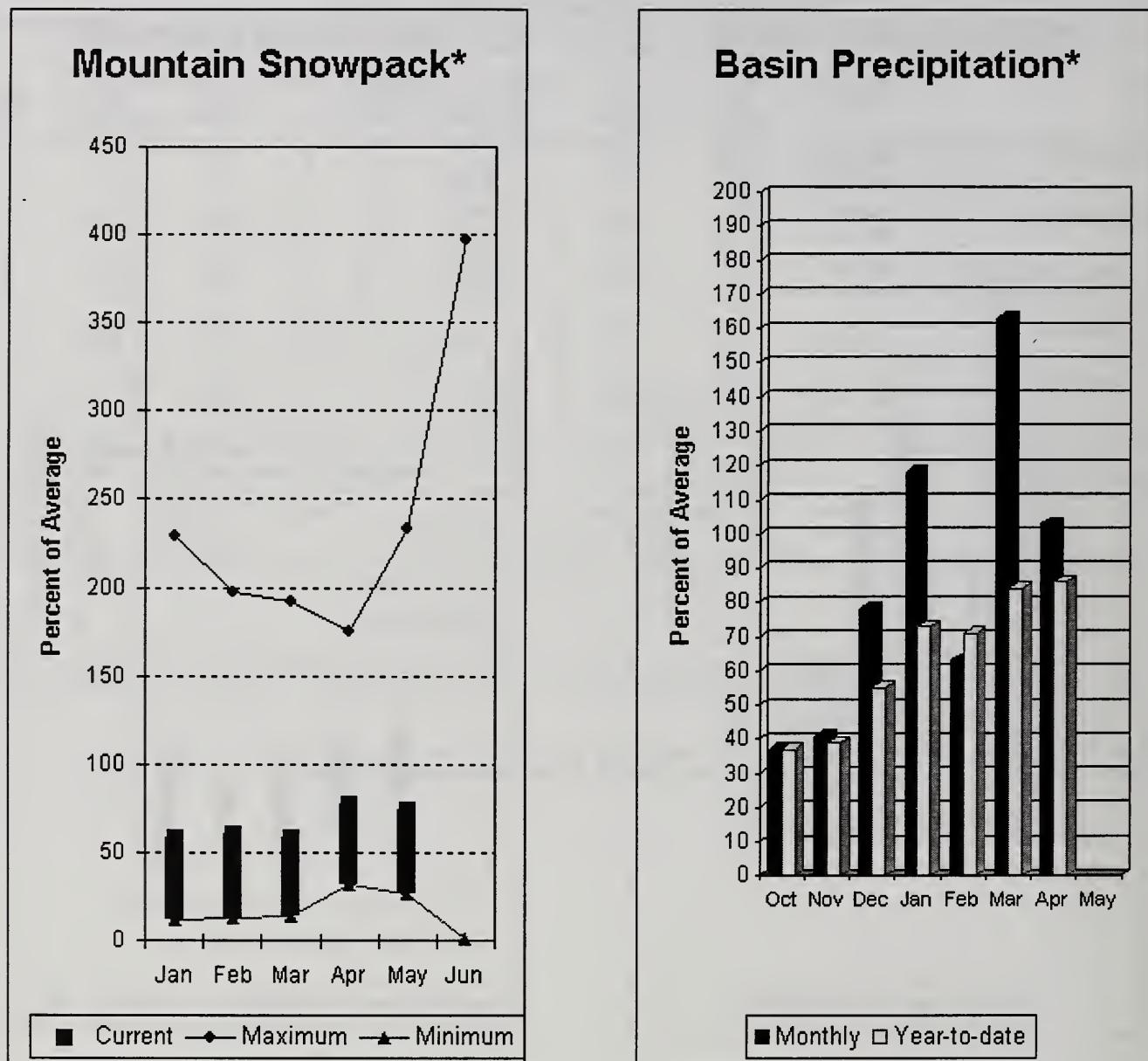
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural volume - actual volume may be affected by upstream water management.

## White - Green River Basins



\*Based on selected stations

Summer runoff is forecast to be 89% of normal for the Green River below Howard Hanson Dam and 86% for the White River near Buckley. May 1 snowpack was 89% of average in both White River and Puyallup River basins and 58% in Green River Basin. Water content on May 1 at Corral Pass SNOTEL, at an elevation of 6,000 feet, was 34.9 inches. This site has a May 1 average of 35.3 inches. April precipitation was 103% of average, bringing the water year-to-date to 86% of average for the basins. Average temperatures in the area were 1 degree above normal last month and 1 degree above for the water-year.

# White - Green - Puyallup River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)	
		Chance Of Exceeding *		50% (Most Probable)		30% 10%			
		90% (1000AF)	70% (1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)		
WHITE near Buckley (1,2)	MAY-JUL	231	285	310	89	335	389	348	
	MAY-SEP	294	353	380	86	407	466	442	
GREEN below Howard Hanson (1,2)	MAY-JUL	105	129	140	88	151	175	159	
	MAY-SEP	122	152	165	89	178	208	185	

## WHITE - GREEN - PUYALLUP RIVER BASINS Reservoir Storage (1000 AF) - End of April

## WHITE - GREEN - PUYALLUP RIVER BASINS Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Average	
		This Year	Last Year	Avg			Last Yr	Average
					WHITE RIVER	3	82	89
					GREEN RIVER	6	36	58
					PUYALLUP RIVER	3	82	89

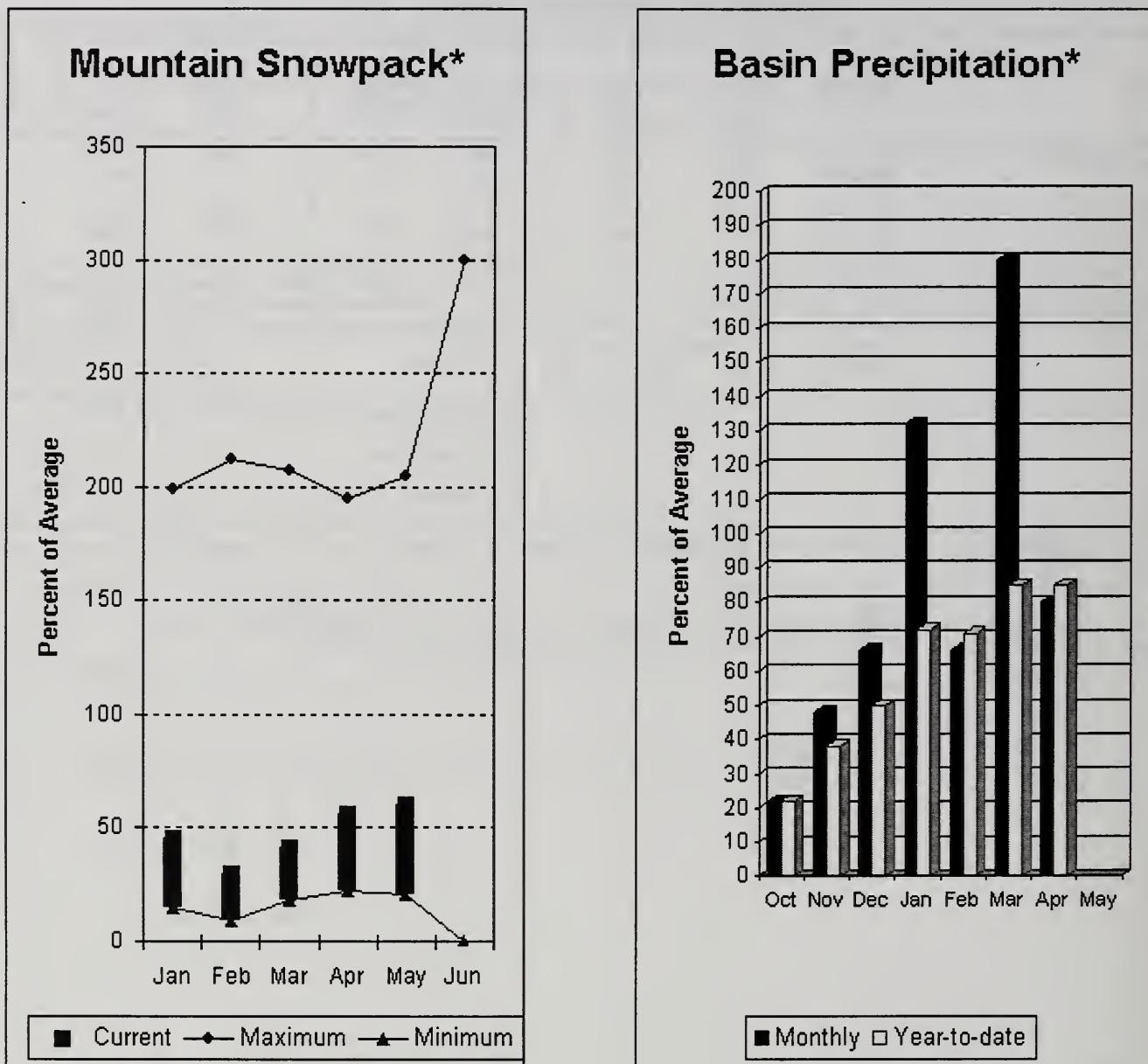
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The average is computed for the 1971-2000 base period.

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# Central Puget Sound River Basins



\*Based on selected stations

Forecast for spring and summer flows are: 90% for Cedar River near Cedar Falls; 90% for Rex River; 91% for South Fork of the Tolt River; and 85% for Cedar River at Cedar Falls. Basin-wide precipitation for April was 80% of average, bringing water-year-to-date to 85% of average. May 1 average snow cover in Cedar River Basin was 57%, Tolt River Basin was 51%, Snoqualmie River Basin was 64%, and Skykomish River Basin was 67%. Olallie Meadows SNOTEL site at 3960 feet, had 39.2 inches of water content. Average May 1 water content is 55.1 inches at Olallie Meadows. April temperatures were near average for the past month and 1 degree above normal for the water-year.

# Central Puget Sound River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)	
		<<===== Drier =====>>		Chance Of Exceeding *		Wetter =====>			
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)		
CEDAR near Cedar Falls	MAY-JUL	35	42	47	90	52	59	52	
	MAY-SEP	40	48	53	90	58	66	59	
REX near Cedar Falls	MAY-JUL	10.5	13.8	16.0	92	18.2	22	17.4	
	MAY-SEP	11.8	15.5	18.0	90	21	24	20	
CEDAR RIVER at Cedar Falls	MAY-JUL	8.9	27	40	85	53	71	47	
	MAY-SEP	2.9	24	39	85	54	75	46	
SOUTH FORK TOLT near Index	MAY-JUL	7.4	8.9	9.9	90	10.9	12.4	11.0	
	MAY-SEP	8.8	10.7	12.0	91	13.3	15.2	13.2	

## CENTRAL PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of April

## CENTRAL PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					CEDAR RIVER	4	23	57
					TOLT RIVER	2	27	51
					SNOQUALMIE RIVER	5	37	64
					SKYKOMISH RIVER	3	42	67

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

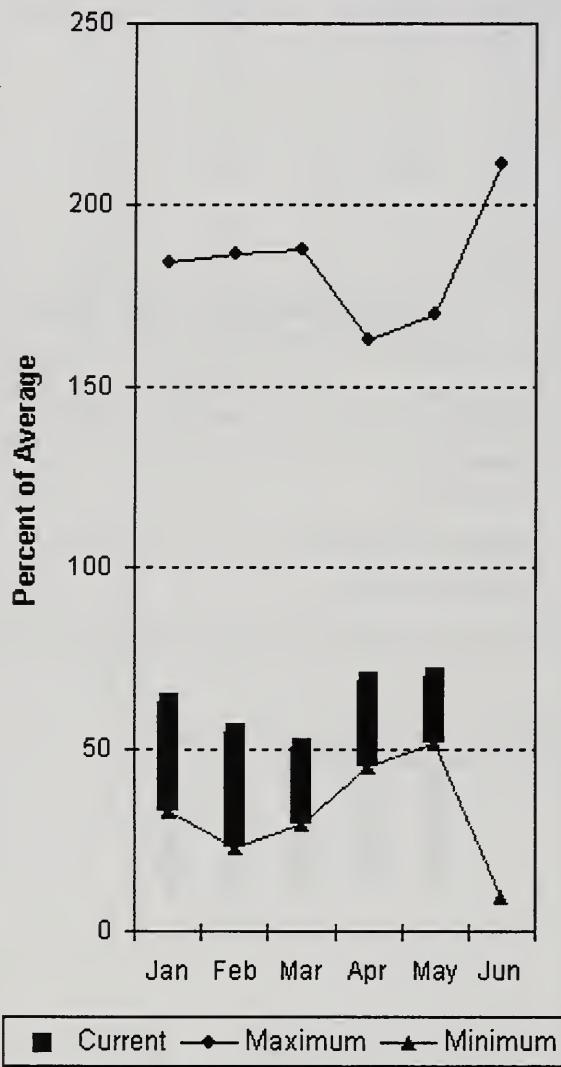
The average is computed for the 1971-2000 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

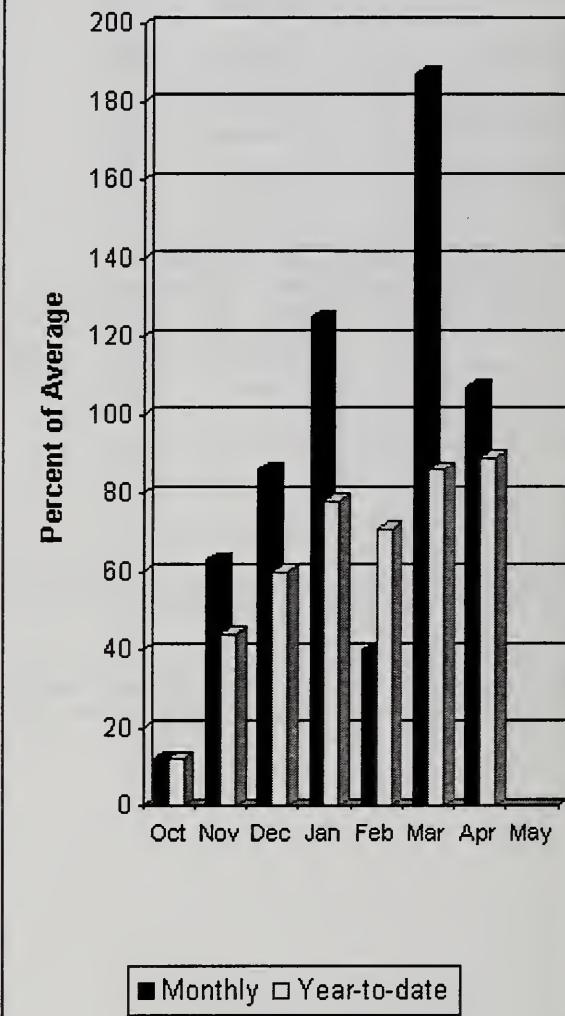
(2) - The value is natural volume - actual volume may be affected by upstream water management.

# North Puget Sound River Basins

## Mountain Snowpack\*



## Basin Precipitation\*



\*Based on selected stations

Forecast for Skagit River streamflow at Newhalem is 87% of average for the spring and summer period. April streamflow in Skagit River was 101% of average. Other forecast points included Baker River at 86% and Thunder Creek at 90% of average. Basin-wide precipitation for April was 90% of average, bringing water-year-to-date to 87% of average. May 1 average snow cover in Skagit River Basin was 75%, Baker River Basin was 87% and Nooksack River Basin was 48%. Rainy Pass SNOTEL, at 4,780 feet, had 34.2 inches of water content. Average May 1 water content is 43.2 inches at Rainy Pass. May 1 Skagit River reservoir storage was 135% of average and 72% of capacity. Average April temperatures were near normal for the basin and 1 degree above average for the water year.

# North Puget Sound River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>				30-Yr Avg. (1000AF)	
		Chance Of Exceeding *		30% (Most Probable)			
		90% (1000AF)	70% (1000AF)	(1000AF)	% AVG.)		
THUNDER CREEK near Newhalem	MAY-JUL	164	179	190	90	212	
	MAY-SEP	254	270	280	90	310	
SKAGIT at Newhalem (2)	MAY-JUL	1255	1341	1400	87	1611	
	MAY-SEP	1553	1647	1710	87	1964	
BAKER RIVER near Concrete	MAY-JUL	495	546	580	85	684	
	MAY-SEP	648	723	775	86	906	

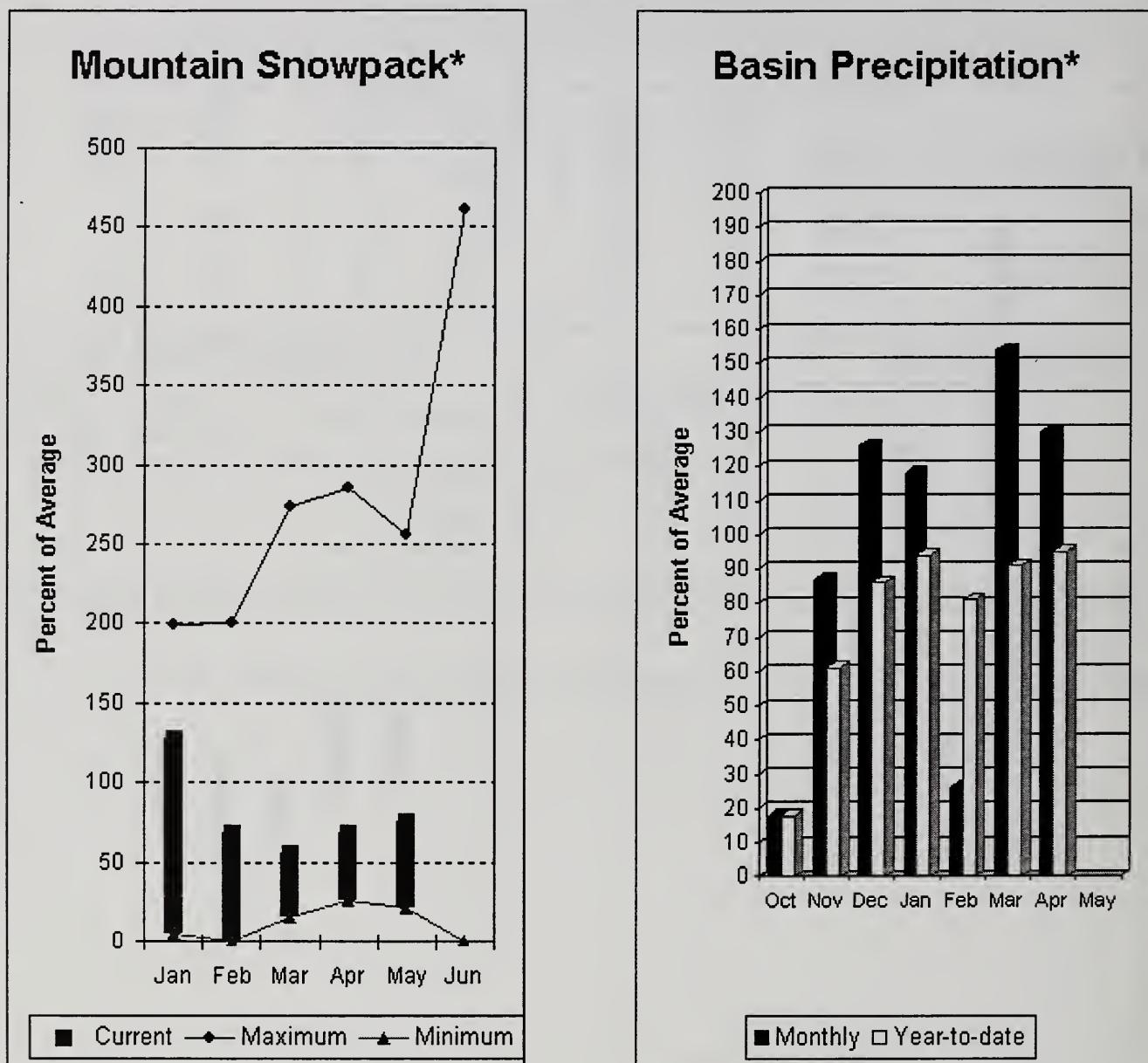
NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of April				NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - May 1, 2003			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average
		This Year	Last Year	Avg			
ROSS	1404.1	989.1	606.4	708.8	SKAGIT RIVER	12	58 75
DIABLO RESERVOIR	90.6	86.3	86.7	85.9	BAKER RIVER	2	72 87
GORGE RESERVOIR	9.8	8.0	7.7	8.0	NOOKSACK RIVER	1	47 48

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

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# Olympic Peninsula River Basins



\*Based on selected stations

Forecasted average runoff for streamflow in the Dungeness River and Elwha River basins is 87% and 86% respectively. Big Quilcene River should expect slightly below average runoff this summer. April precipitation was 130% of average. Precipitation has accumulated at 95% of average for the water year. April precipitation at Quillayute was 10.37 inches. The thirty-year average for April is 7.44 inches. Olympic Peninsula snowpack averaged 75% of normal on May 1. Mt. Crag SNOTEL, on the East slope, reported 75%. Temperatures were near average for the month and 1-2 degrees above average for the water year.

# Olympic Peninsula River Basins

## Streamflow Forecasts - May 1, 2003

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)	
		<<===== Drier =====>>		Chance Of Exceeding *		Wetter =====>>			
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)		
DUNGENESS near Sequim	MAY-SEP	101	109	115	87	121	129	132	
	MAY-JUL	80	86	90	86	94	100	105	
ELWHA near Port Angeles	MAY-SEP	320	347	365	86	383	410	423	
	MAY-JUL	254	276	290	86	304	326	338	

## OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of April

## OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - May 1, 2003

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
					OLYMPIC PENINSULA	4	63	75
					ELWHA RIVER	1	60	70
					MORSE CREEK	1	63	75
					DUNGENESS RIVER	1	60	79
					QUILCENE RIVER	1	67	75
					WYNOCHEE RIVER	0	0	0

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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*Issued by*

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## The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work\*:

### **Canada**

Ministry of Sustainable Resources  
Snow Survey, River Forecast Centre, Victoria, British Columbia

### **State**

Washington State Department of Ecology  
Washington State Department of Natural Resources

### **Federal**

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    Corps of Engineers  
U.S. Department of Agriculture  
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    NOAA, National Weather Service  
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Washington Water Power Company  
Snohomish County P.U.D.  
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# Washington Water Supply Outlook Report

Natural Resources Conservation Service  
Spokane, WA

